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Can quantification of serum glycans predict pre-eclampsia?

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Objectives

To determine if concentrations of placental glycans and glycan components are altered in pre-eclampsia and to determine if serum levels can predict pre-eclampsia.

Methods

Serum samples were collected from women in the third trimester of singleton pregnancy but before the onset of pre-eclampsia (n=10) and also from women during unaffected pregnancies at the same gestational age. Tissues were collected from the basal plate of placentas collected at delivery following uncomplicated singleton pregnancy (term and preterm) and from pregnancies complicated by preeclampsia (n=8). Pre-eclampsia was diagnosed according to International Society for the Study of Hypertension in Pregnancy criteria. Glycan components were isolated using a combination of enzyme digestion, molecular weight filtration and ion exchange chromatography, and then derivatised prior to separation using hydrophilic interaction liquid chromatography. Components were detected using electrospray ionisation operated in positive ion mode with single ion monitoring.

Results

Specific glycan components (designated glycan 1, 2 and 3) were significantly altered in the serum from women who went on to have pre-eclampsia compared to those who had an unaffected pregnancy. Interestingly levels of the same biomarkers were also elevated in nulliparous versus multiparous pregnancy. Biomarkers were also significantly altered in placental tissues from pregnancies complicated by preeclampsia

Conclusion

This study suggests that altered glycan levels may contribute to impaired placental development and that the glycome is a potential diagnostic target for pre-eclampsia, and possibly other disorders of pregnancy.